LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Dec. 10-14, 2012

CONTRA COSTA TIMES
ContraCostaTimes.com

AT THE ELEMENTARY CREATION

Tossing miniature marshmallows into the mouths of students may be a new way to teach science.

That's what Lawrence Livermore's Mark Stoyer and his wife, Nancy, did recently when they helped explain the process of creating a new element.

The Stoyers -- part of a Livermore team that discovered the new element livermorium -- gave the presentation at Andrew Christensen Middle School in Livermore.

During the class, the marshmallows represented calcium ions; the students were the curium targets the scientists bombarded, in an effort to show how livermorium was discovered.

"What you saw there is that science is messy and most of them missed their targets," Mark Stoyer told the students. "If this bag had 1,000 marshmallows in it, I'd have to throw 6 billion bags per second for three months ... That's how hard it is."

To read more, go to the *Contra Costa Times*.

NBC BAY AREA **A NEW DAWNING**

Dawn Shaughnessy prepares a sample for chemical analysis.

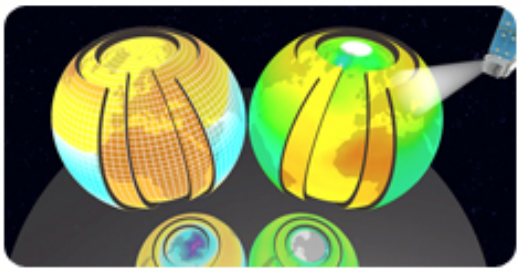
You could say that Lawrence Livermore's Dawn Shaughnessy is in her element. When it comes to adding to the periodic table, she is one of a team who has discovered six new elements.

For her accomplishments, KNTV recently featured Shaughnessy as one the top 10 "Bay Area Proud" stories of the year.

"We're pushing the boundary of how people model our universe. It gives us a rush when we see that data. It's an amazing feeling, " she said.

To see more, go to KNTV.

CLIMATE CENTRAL **FINGERPRINTS DON'T LIE**



The image shows a month-by-month sequence of atmospheric temperature changes over the 396-month period from January 1979 through to December 2011.

Climate has changed plenty of times in the past, but that alone doesn't prove anything. Tying climate change to human greenhouse-gas emissions -- an area known as detection and attribution, or fingerprinting -- is a lot harder.

Using state-of-the-art climate models, Ben Santer of Lawrence Livermore and 21 colleagues have found what they call "some of the clearest evidence to date of a discernible influence on atmospheric temperature."

They found that while the troposphere -- the lowest part of the atmosphere -- has warmed over the past three decades, the stratosphere, which starts 5 to 12 miles above the ground, has cooled. This is exactly what you'd expect if greenhouse gases were trapping heat near the surface rather than letting it percolate upward.

"After removing all global mean signals," the authors write, referring to natural changes like volcanic eruptions and changes in the brightness of the sun, "model fingerprints remain identifiable in 70 percent of the tests involving tropospheric temperature changes."

To read more, go to *Climate Central*.

WIRED

A POTENTIAL NEW BOOST TO THE ELECTRICAL GRID

Preamplifiers line a corridor at the Laboratory's National Ignition Facility.

The day after this year's Independence Day fireworks lit up American skies, scientists at the National Ignition Facility (NIF) released the most powerful laser shot in history. For a brief moment, 192 laser beams fired simultaneously at a 2mm-diameter target, producing 500 trillion Watts of power and 1.85 megajoules of UV laser light -- 100 times more than any other laser has produced.

The laser has taken the facility a step nearer its goal: fusion ignition, the point at which nuclear-fusion reactions become self-sustaining and churn out more energy than was originally supplied. It's the same process that gives stars their energy and it could provide the world with abundant, sustainable power.

The conditions required for ignition are within reach.

To read more, go to *Wired*.

GSN: Government Security News

TRACKING GETS FASTER

Inside the National Atmospheric Release Advisory Center.

Computer predictions of how dangerous gases and other substances move through the atmosphere and the landscape after a nuclear or hazardous material release event are now 50 times faster.

The National Nuclear Security Administration (NNSA) has installed a 336-processor computing cluster at the Lawrence Livermore's National Atmospheric Release Advisory Center (NARAC). The new cluster allows the accelerated consequence predictions for hazardous material releases.

NARAC provides critical atmospheric modeling predictions and analysis to emergency managers and decision makers throughout the country. NARAC has responded to hundreds of alerts, accidents and disasters since it was created in 1979, including the Three-Mile-Island and Chernobyl nuclear power plant disasters. NARAC's predictions inform actions that may be needed to protect the public and environment in the event of a hazardous release. The predictions can help in potential accident scenarios that include releases from nuclear power plants as well as transport and fallout from nuclear detonations or radiological dispersal devices.

To read more, go to *Global Security News*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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